Operating Instructions

Digital Tank Contents Indicator DIT 01

DIT 01 AN 52122

DIT 01-E AN 52123

- ☞ Read instructions before using device!
- ☞ Observe all safety information!
- ☞ Keep instructions for future use!

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1 Application

The DIT 01 digital tank contents indicator is suitable exclusively for the measurement of filling levels in heating oil tanks with heights up to 3 metres.
Any use other than the use explicitly permitted in this instruction manual in not permitted.
Changes made to the product by unauthorised persons may lead to incorrect readings and are prohibited for reasons of safety.
Afriso-Euro-Index shall not be liable for damages resulting from such tampering or for damages resulting from any use other than the use explicitly permitted in this instruction manual

Attention!
The tank contents indicator DIT 01 must not be operated in hazardous areas.

- ➢ DIT 01 may only be installed by authorised, qualified experts in accordance with these operating instructions.
  The warrantee shall be void in the case of improper installation.
- ➢ The tank contents indicator DIT 01 is not a safety device. It does not replace the function of a limit value transducer at the heating oil tank.
- ➢ The tank contents indicator DIT 01 may only be installed in unpressurised heating oil tanks. A tank vent installed in accordance with the pertinent regulations as well as a limit value transducer are required.
- ➢ The cable entry point of the pressure sensor into the heating oil tank must be significantly higher than the maximum filling level and must be sealed with the enclosed screw connections in such a way that no oil vapours can escape and that the pressure sensor cannot move vertically
- ➢ The measured values displayed, especially the litre indication values, must not be used for billing purposes. The accuracy of the measured values displayed depends on the accuracy of the tank data determined and entered. Therefore, the manufacturer cannot guarantee the accuracy required for billing purposes.

2 Product description

2.1 Design

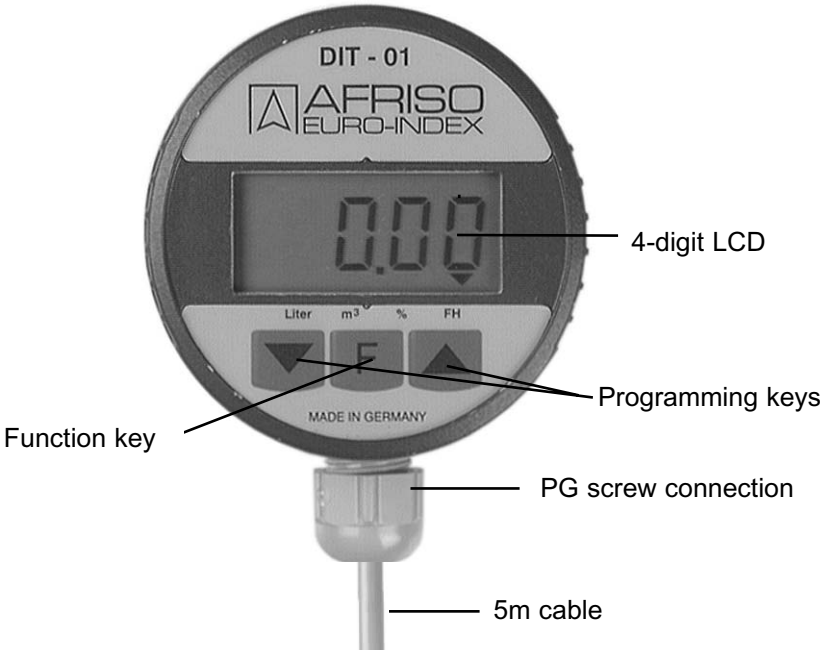
The DIT 01 tank contents indicator consists of an electronic pressure sensor and a microprocessor-controlled indication system contained in a sturdy plastic housing. The measured values are shown on a 4-digit liquid crystal display (LCD). The function key F allows you to switch on the device and select the display modes litres, cubic metres, percentage and filling level. The device is programmed via the two keys ▲ and ▼ A 3.6 V lithium battery is contained in the housing of the tank contents indicator. Under normal conditions (F key is pressed once a month), the battery will have a service life of approx. 8 years. The battery is not connected when the device is shipped. Prior to commissioning, the battery plug must be connected to the printed circuit board.

The tank contents indicator comes with a 5 m long cable. The free end of the cable is connected to the pressure sensor. The pressure sensor and the tank contents indicator form one unit. The pressure sensor is placed in the tank from the top and is mounted either with a PG connection or a Euroflex combination withdrawal fitting and sealed.

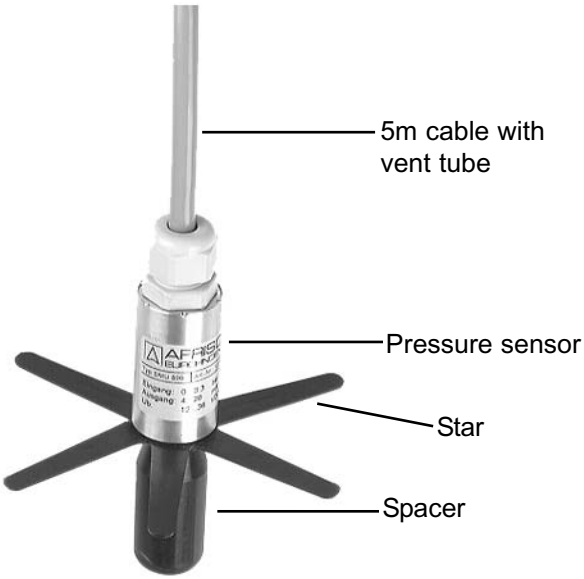
The pressure sensor includes a spacer so that the measuring hole of the pressure sensor remains above the oil sludge level. Different screw connections are shipped with the pressure sensor which are used to mount the pressure sensor cable to the tank and seal it.

2.2 System parts, controls and display elements

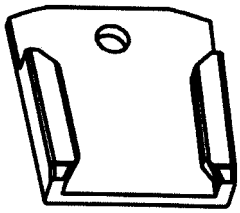
Tank contents indicator DIT 01:



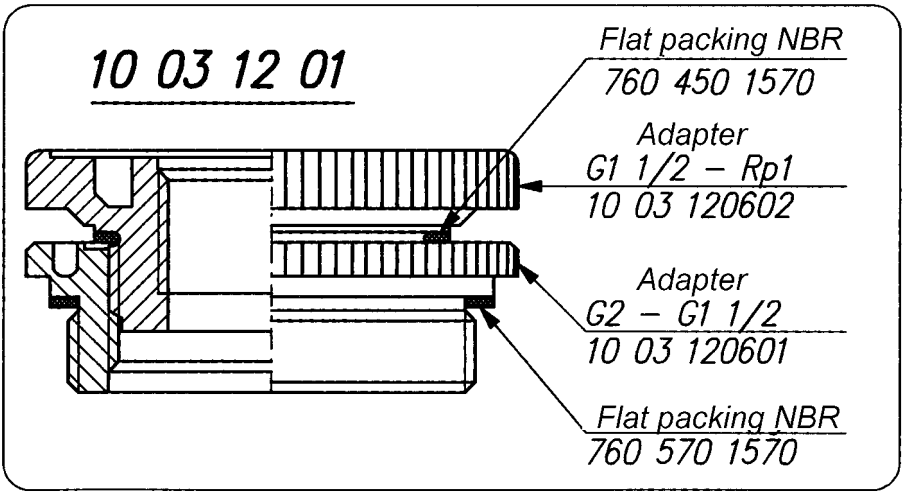
Pressure sensor with spacer:



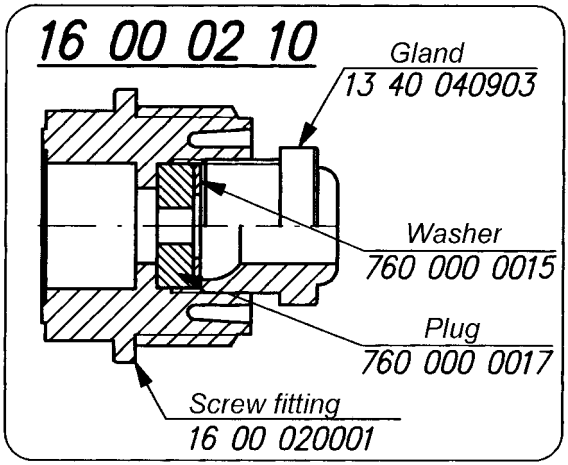
Wall holder for DIT 01:



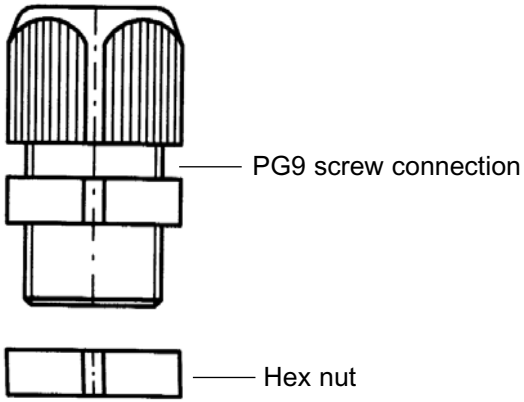
Screw connection set 2" x 1½" 1":



Screw connection 1":



PG9 screw connection:



Euroflex combination withdrawal fitting, not connected.

2.3 Function

The pressure sensor is located at the lowest point of the heating oil tank and transforms the hydrostatic pressure of the heating oil into an electrical signal. The measuring signal is transmitted to the tank contents indicator via the cable. The electronic system of the tank contents indicator uses this signal to calculate the tank contents, which it displays in litres, cubic metres, percentage or filling level. The display mode is selected by means of the F function key. The tank data is entered via the two programming keys.

2.4 Specifications

Pressure sensor:

Dimensions:	ø=25mm, L=107mm
Weight:	410 g
Cable length:	5m
Pressure range:	0-300mbar
Housing:	Stainless steel 1.4305
Cable:	Heating oil-resistant PVC
Spacer:	POM, PE
Additional parts coming into contact with the medium:	Ceramiks, silicon, silicone glue, Viton
Protection:	IP 68 EN 60529
Permissible ambient temperature:	0°C to 60°C
Accuracy*:	≤ ± 1,0% FSO, IEC 60770
Temperature error:	≤ ± 2% FSO, 0 to 60°C
Noise suppression:	According to 50081-2
Noise immunity:	According to 50082-2

Tank contents indicator:

Dimensions:	ø=75mm, H=50mm
Weight:	380 g
Housing material:	PA6 15%, glass ball reinforced
Cable length:	5m
Power supply:	3.6 V lithium battery
Battery life:	Max 8 years, depending on usage
Display:	4-digit LCD
Resolution:	14bit
Measuring input:	0 to 3,6V
Accuracy*:	≤ ± 1,0% FSO, IEC 60770
Permissible ambient temperature:	0 to 45°C
Protection:	IP 51 EN 60529
Noise suppression:	According to EN 50081-1
Noise immunity:	According to EN 50082-1

Accuracy of complete system *: < ± 1,5% FSO, IEC 60770

* With reference to the filling level indication in mm.

2.5 Scope of delivery

DIT 01 Item no Art.-Nr. 52122:

Tank contents indicator DIT 01
Pressure sensor with spacer
Connection set 2" x 1½" x 1"
Screw connection 1"
Screw connection PG9
Moisture-proof junction box
Insulating screw joint, 4 poles
Wall holder for DIT 01
Operating instructions

DIT 01-E Item no Art.-Nr. 52123:

Tank contents indicator DIT 01
Pressure sensor with spacer
Euroflex combination withdrawal fitting with 3.1 m suction tube
2 O rings 6.5 x 1.5 mm
Pressure screw
Moisture-proof junction box
Insulating screw joint, 4 poles
Wall holder for DIT 01
Operating instructions

3 Mounting and Operation

3.1 Tank data determination

Before the DIT 01 tank contents indicator is installed, you must determine the appropriate tank data. Please document the tank data on this page for safety reasons and to allow for subsequent checks.

1. Tank shape

Refer to the table below to find the appropriate code for the tank shape. If you want a linear indication, use the code 1.

Tank shape code	Tank shape	Description of tank shape
1	Linear tank	Rectangular tanks, upright, cylinders, steel tanks welded in base ments, all other linear measuring applications.
2	Tubular tank	Vertical cylinder
3	Ball-shaped tank	Ball-shaped tank
4	Plastic battery tank	Plastic battery tanks with armouring or arches
5	Oval tank	Oval basement tanks, e.g glass-fibre reinforced tanksor steel sheet tanks
6	Plastic tank with recess	Plastic tanks with major recess major in the centre (manufacturers: e.g. Roth, Werit)

Enter the tank shape here:

Tank shape code: _____

2. Tank volume

Determine the total volume of the tank facility in litres and enter it here:

Tank volume: _____ in litres

3. Tank height (max. filling level)

Determine the tank height in mm and enter it here:

Tank height: _____ mm

4. Current filling level

Determine the current filling in mm level as exactly as possible and enter it here:

Current filling level: _____ mm

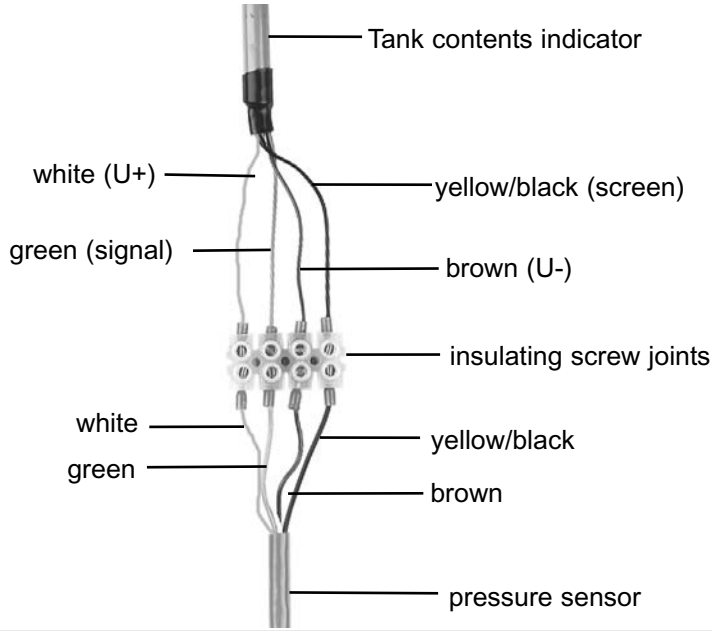
3.2 Installation and commissioning

Wall holder:
➢ Use the enclosed screw (4 x 30 mm) and, if necessary, a dowel (6mm) to mount the wall holder for the DIT 01 tank contents indicator at the desired location.

Moisture-proof junction box:
➢ Use the enclosed screws and, if necessary, dowels, to mount the moisture-proof junction box for connecting the pressure sensor cable and the cable of the tank contents indicator at the desired location. Make sure to provide sufficient cable length. The tank contents indicator must be able to be removed from the wall holder, e.g. if you need to replace the battery.
➢ Place the tank contents indicator into the wall holder and route the cable into the moisture-proof junction box.
➢ Push the connection elements required for the tank connection (PG connection, screw connection or Euroflex) onto the pressure sensor cable in the correct sequence and orientation.

Cable connection:
➢ Route the cable of the pressure sensor to the moisture-proof junction box and connect the two cables by means of the insulating screw joint. Make sure to connect the wires of the same colour, respectively. A transparent tube can be seen at the cable end of the pressure sensor. This tube provides the pressure sensor with atmospheric pressure. Make sure not to close or bend this tube. The moisture-proof junction box should not be completely tight in order to avoid incorrect measurements.

Connecting the pressure sensor to the tank contents indicator:



pressure sensor:

➢ After you have electrically connected the pressure sensor and the tank contents indicator, open the housing of the tank contents indicator by turning the upper part of the housing all the way to the stop and pulling it up.

➢ Plug the 2-pole battery plug into the 2-pole socket on the printed circuit board.

Zero balancing:

➢ Close the housing of the tank contents indicator by pushing the two housing parts together. Since the battery was connected, the tank contents indicator was switched on. When the battery is connected for the first time, the zero balancing function is started once. The display switches between "Zero" and the current offset of the pressure sensor (indication in hPa = mbar). The top left corner of the display shows the arrows ▲ ▼. to indicate that you are in calibration mode. By pressing the ▲ and ▼ keys simultaneously, you correct the offset to the value 0.00.
When you do this, the pressure sensor must not be in the tank! In this state, you can zero the system any number of times. Press the F key in order to exit the zero balancing mode. An arrow is shown at the bottom of the display pointing to the unit Litres

Mounting the pressure sensor:

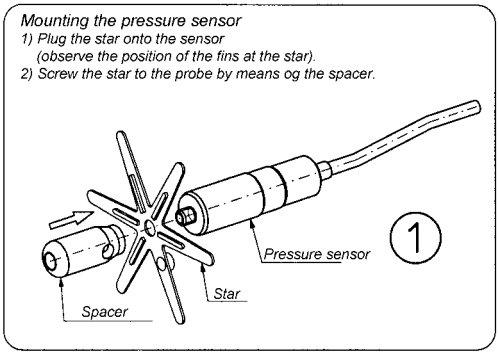
➢ After you have zeroed the unit, install the pressure sensor in the tank. Insert the probe head into the tank from the top. Fixate the cable in the screw connection in such a way that the probe tip just reaches the tank bottom. The measuring hole of the pressure sensor must not be immersed in the oil sludge. The oil volume below the level of the measuring hole is not detected by the pressure sensor! Seal the PG connection or the Euroflex in the tank cover to make the connection smell-tight and tighten the PG connection to prevent the cable from moving

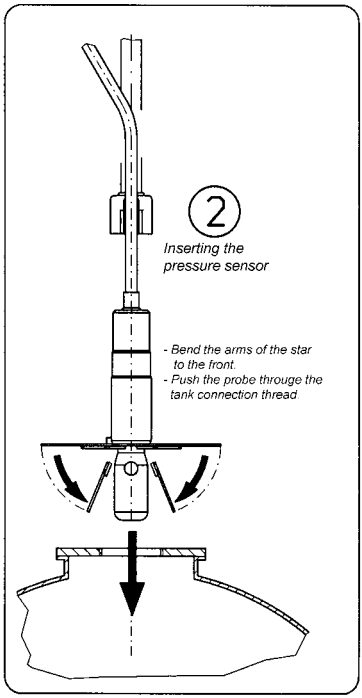
Different options are available for mounting the pressure sensor in the tank::

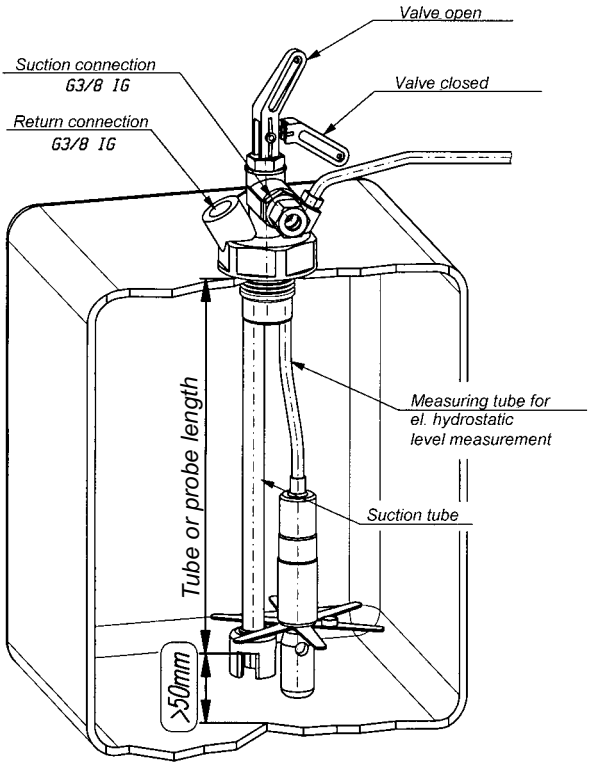
Mounting with Euroflex:

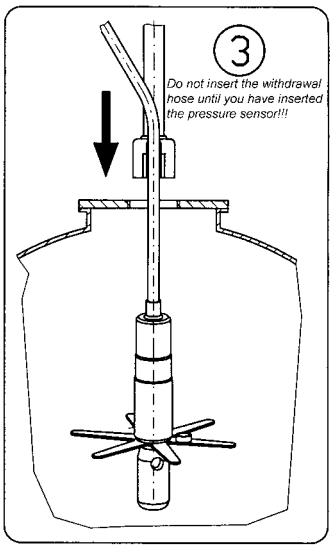
1) In combination with the Euroflex withdrawal fitting:
Lower the pressure sensor into the tank Move the cable in the Euroflex withdrawal fitting until the probe tip just reaches the tank bottom. The measuring hole of the pressure sensor must not be immersed in the oil sludge. After having adjusted the correct cable length, tightly screw the black plastic screw (pressure screw) into the body of the Euroflex fitting. This applies pressure to the two O rings between the cable and the body of the Euroflex fitting, fixates the cable and assures a pressure-tight connection.

Mounting with Euroflex:


Mounting the pressure sensor
1) Plug the star onto the sensor
(observe the position of the fins at the star).
2) Screw the star to the probe by means og the spacer.
Pressure sensor
1
Star
Spacer







Mounting with 1“-, 1½“- or. 2“-screw connection:

2) Using a free 1", 1½" or 2" connection in the tank
Insert the cable of the pressure sensor into the 1" screw connection and use parts of the 2“ x 1½“ x 1 “screw connection set to seal it in the tank. Determine the required cable length as described above. Then tighten the screw connection in such a way that the cable can no longer move and that the connection is smell-tight.

Mounting with PG9 connection:

3) In an installation flange with union nut, in a screw cap or in sa free blind connection:
Remove the installation flange, the screw cap or the blind connection and drill a 15 mm hole. Insert the enclosed PG9 connection and fasten it with the enclosed nut. Insert the cable of the pressure sensor into the PG connection, determine the required length as described above and fixate it in a smell-tight way.

Attention: Never drill directly into the tank!

When drilling, make sure that chips do not fall into the tank.

After you have installed the pressure sensor in the tank, you have to enter the tank data determined in the previous step (see page 10).

Entering the tank data:

1. Tank shape:

The arrow at the bottom of the display points to the unit Litres. The display shows the tank shape code of the currently selected tank shape. When the unit is commissioned for the first time, the display show the tank shape code 0. The 0 indicates that no tank shape code has yet been selected. Use the ▲ and ▼ keys to set the previously determined tank shape code (see page 10). Press the F key to confirm the tank shape setting and continue with the tank volume data.

2. Tank volume:

The arrow at the bottom of the display points to the unit m3. The display shows the currently selected tank volume. If the display shows 0000 this means that no tank volume has yet been entered.

Use the ▲ and ▼ keys to set the previously determined total volume of the tank facility. Press ▲ to select the digit to be modified. Press ▼ to change the selected digit in the range from 0 to 9 Volumes of up to 9999 litres are entered without a comma digit. Volumes greater than 9999 litres are entered as cubicmetres (1000 litres = 1 cubicmetre) with a comma digit. Press ▲ to move the comma digit. Press the F key to confirm the volume setting and continue with the tank height data.

3. Tank height:

The arrow at the bottom of the display points to the unit Percentage. The display shows the currently selected tank height. If the display shows 0000 this means that no tank height has yet been entered. Use the ▲ and ▼ keys to set the previously determined tank height. Press ▲ to select the digit to be modified. Press ▼ to change the selected digit in the range from 0 to 9. Press the F key to confirm the volume setting and continue with the current filling level data.

4. Current filling level:

The arrow at the bottom of the display points to the unit Filling Level (FH). The display shows the filling level currently measured by the probe. If you measure heating oil, the reading should be pretty close to the actual filling level. If you need a greater accuracy, enter the previously determined filling level. Please note: the fuller the heating oil tank, the greater the accuracy. The maximum accuracy is obtained if the tank is completely full. At levels of less than 50%, a correction of the value indicated is not meaningful. In order to correct the current filling level, you can overwrite the displayed value. Use the ▲ and ▼ keys to set the previously determined filling level. Press ▲ to select the digit to be modified. Press ▼ to change the selected digit in the range from 0 to 9. Press the F key to confirm the filling level setting.

You have now entered all the required tank data and the tank contents indicator switches to normal measuring mode. The ▲ ▼ symbol in the top left corner of the display is no longer shown

3.3 Measuring

Press the F key to switch on the display of the tank contents indicator. The tank contents indicator is automatically switched off approx. 2.5 minutes after you press a key. The display shows OFF. In this mode, the battery is not used. By pressing the F key again, you reactivate the tank contents indicator for another 2.5 minutes and the current filling level is displayed. The F key allows you to select one of the four display formats for the filling level.

1. Displaying the volume in litres.
The arrow at the bottom of the display points to litres.
2. Displaying the volume in m3.
The arrow at the bottom of the display points to m3.
3. Displaying the volume in percent of the total contents.
The arrow at the bottom of the display points to %.
4. Displaying the filling level in mm.
The arrow at the bottom of the display points to FH.

If the measured value exceeds the tank entered data (e.g. because you entered incorrect tank data), the display will blink. The display will toggle between the indicated value and four dashes (----). Only the current filling height in mm will be displayed permanently. By holding down the ▲ and ▼ keys simultaneously for three seconds, you can activate the "Enter tank data" mode. The top left corner of the display shows the ▲ ▼. symbol. Now you can either check or correct the tank data. If you do not want to change the tank data, press the F key four times in order to return to the normal measuring mode. The▲ ▼ symbol in the top left corner of the display disappears.

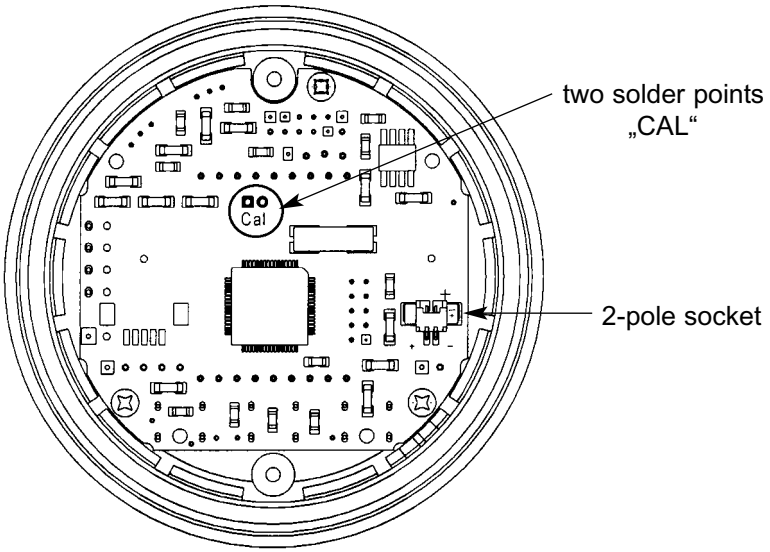
3.4 Maintenance

1. Battery: If the battery voltage drops below a critical voltage level, the display shows a battery symbol in the bottom left corner. The filling level is still indicated, but you should replace the battery as soon as possible. After you have changed the battery, the unit immediately switches to the regular display mode. The stored tank data are not lost.

2. Correction of the tank data: You can correct the tank data at any time during normal operation. Simply hold down the▲ and ▼ keys simultaneously for three seconds to activate the appropriate mode. The top left corner of the display shows the ▲ ▼. symbol. Please refer to page 16 for information on entering the tank data.

3. Zero balancing: The zero balancing mode is activated when you plug the battery plug into the 2-pole socket on the printed circuit board of a new device. Whenever you disconnect or reconnect the battery of this device at a later point in time, the unit activates the normal operating mode. If you need to zero the unit again, you must connect the two solder points designated with "CAL" while you plug the battery plug into the 2-pole socket on the printed circuit board (see figure below). As soon as the battery plug is plugged in, you can disconnect the two solder points. The stored tankdata will be lost. Now press the ▲ and ▼ keys simultaneously to zero the device.

   Make sure the probe is not immersed in heating oil when you zero the device!



4. Cable break: In case of a cable break or if the probe is not connected, the display keeps switching between "9999" and "----".

5. Short circuit: In the case of a short circuit in the connection cable between the pressure sensor and the tank contents indicator, the unit displays a 0 even if the actual filling level is different.

6. Incorrect reading: If the filling level indicated differs from the real filling level, you should check the tank data.

7. No indication: If the display remains blank, check whether the battery is empty and make sure the battery plug is properly connected with the printed circuit board.

8. General: Briefly press the F key to display the current filling level reading. The filling level is displayed for a period of approx. 2.5 minutes. After that, the device switches off automatically. The display indicates OFF. If the battery symbol is displayed, you should replace the battery. Beyond that, the tank contents indicator is maintenance-free. Dispose of used batteries in accordance with the pertinent disposal guidelines/regulations.

4 Appendix

4.1 Spare parts, accessories

Tank contents indicator DIT 01	695 000 0001
3.6 V Lithium battery for DIT 01	683 000 0009
Wall holder for DIT 01	00 24 000111
Pressure sensor 0 - 300 mbar	550 000 0057
Moisture-proof junction box	639 000 0004
Insulating screw joint, 4 poles	690 000 0009
PG9 connection	685 000 0044
Star	11 67 040010
Spacer	11 67 040011
Screw connection 1"	16 00 02 10
Screw connection set 1" - 1½" - 2"	10 03 12 01
Screw connection + Screw connection set	52125

4.2 Warranty

The manufacturer's warranty for this product is twelve months after the date of purchase.
Within the warranty period, we shall repair or replace, at our discretion, free of charge, all de fects of the device resulting from defective materials or workmanship. The following defects are not covered by t he warranty: defects resulting from the improper use of the device, from normal wear and tear, and defects which affect the value or usability of the device only to a minor degree.

The warranty shall be void if spare parts other than genuine AFRISO spare parts are used or if unauthorised parties open the product, modify it or tamper with it in any other unauthorised way. This warranty shall be good in all countries in which this device is sold by Afriso-Euro-Index or its authorised dealers.

4.3 Copyright

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4.4 Liability information

The manufacturer or the sales company shall not be liable for costs or damages incurred by the user or by third parties in the usage or application of this device, in particular in the case of improper use of the device, misuse or malfunction of the connection, malfunction of the device or other devices.
The device may only be used in closed rooms. Avoid extreme ambient conditions, in particular humidity. Unauthorised modifications of the device are prohibited! Neither the manufacturer nor the sales company shall be liable if the device is not used as per instructions.